TIGGER *Transit Investments for Greenhouse Gas and Energy Reduction*

U.S. Department of Transportation
Federal Transit Administration

Courtesy of Metro Mobility

Project name: Minneapolis-St. Paul Hybrid Buses

Transit agency: Metro Mobility of Minneapolis-St. Paul Metropolitan Council

Location: Minneapolis, Minnesota

TIGGER goal: Energy and GHG emissions reduction

FTA region number: V

Award amount: $1,100,000

Congressional district: MN-2; MN-3; MN-4; MN-5; MN-6

Funding mechanism: Recovery Act (ARRA)

Hybrids Hit the Road in Minnesota

A public transportation service in Minnesota's Twin Cities is using hybrid buses to reduce energy use and greenhouse gas emissions.

Vehicle Project

The Minneapolis-St. Paul region's Metro Mobility, which provides transit services to riders with disabilities, was scheduled to replace 35 small diesel buses. Each of the buses, on Ford E-350 chassis, had operated 225,000 miles or more. Using $1.1 million in TIGGER funds, Metro Mobility replaced 15 of the 35 buses with gasoline-electric hybrid buses integrated on Ford E-450 chassis.

The new gasoline-electric hybrid buses, which began operating in November 2009, are 10%–20% more fuel efficient than conventional gasoline buses. Their propulsion system, manufactured by Azure Dynamics Corporation, has a parallel hybrid configuration: the gasoline engine has a mechanical connection to the electric motor, which also functions as a generator to power electrical systems on the vehicle. The parallel hybrid system architecture is E85-compatible and anti-idle compliant. In addition to reducing fuel consumption, the hybrid system's regenerative

Metro Mobility is the oversight division for the Americans with Disabilities Act (ADA) paratransit service operating through the Metropolitan Council in the Minneapolis-St. Paul region. Metro Mobility provides shared public transportation to certified riders who are unable to use regular fixed-route buses, due to a disability or health condition. Metro Mobility provides transit for any purpose to eligible riders. With a peak fleet of 265 small buses and 18 automobiles, the service delivered 1.22 million rides in 2008. Metro Mobility owns its vehicles and purchases fuel for the fleet.

Courtesy of Metro Mobility

A Metro Mobility gasoline-electric hybrid bus in service in the Minneapolis-St. Paul area.

braking reduces brake wear and maintenance by 75%. Engine run time and maintenance are reduced by about 25%.

As an additional component of the TIGGER project, Metro Mobility purchased a conventional gasoline bus retrofitted with an Eaton hydraulic launch-assist (HLA) system, as part of a field test for the HLA technology. Eaton financed, installed, and maintains the HLA system, while Metro Mobility operates the vehicle in service as a pilot project to collect real-world operations data. During vehicle deceleration, the HLA system captures energy that would otherwise be lost to friction and heat, and stores it in a hydraulic accumulator filled with nitrogen gas. The energy is then returned to the vehicle drive train during subsequent acceleration, thereby reducing the amount of work required from the internal combustion engine. The HLA system is especially well suited to reduce fuel consumption in Metro Mobility's repetitive stop-and-go drive profiles.

Impact:

These E85-compatible gasoline-electric hybrid buses have 10% better fuel efficiency and lower braking system and engine maintenance costs than the buses they replaced.

Project partners also included Turtle Top, which provided vehicle modifications and systems integration, and vehicle retailer Hoglund Bus & Truck Co.

About TIGGER

The Transit Investment for Greenhouse Gas and Energy Reduction (TIGGER) Program *was established in 2009 by the U.S. Department of Transportation's Federal Transit Administration (FTA). Designed to reduce energy use and greenhouse gas emissions in transit agencies around the country, the TIGGER Program made funds available for capital investments that would reduce greenhouse gas emissions or lower the energy use of public transportation systems. An initial $100 million in American Recovery and Reinvestment Act grants funded 43 competitively-selected transit projects. In 2010, the FTA provided an additional $75 million in grants to fund 27 new TIGGER projects. These 70 projects are employing a variety of technologies to meet the program goals, including solar installations, building efficiency improvements, wind technology, wayside energy storage for rail, and purchase of more efficient buses. In fiscal year 2011, FTA provided an additional $49.9 million to continue the program.*

For More Information

Metro Mobility:
www.metrocouncil.org/transportation/MetroMobility

FTA TIGGER:
www.fta.dot.gov/TIGGER

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